1 February 1967

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P/O T-906

TECHNICAL MANUAL

INSTRUCTIONS

AND

PARTS BREAKDOWN

TRANSCEIVER TEST ADAPTER

MODEL NO. ACR A2A

(ACR ELECTRONICS CORP.)

ACR-2A Test Jig
T-906

TABLE OF CONTENTS NOT T-906

SECTION I			PAGE
1.0		General	1
2.0		Purpose	1
3.0		Description	1
4.0		Preparation for Use	1
	4.1	Calibration of Test Adapter ACR A2A	4
5.0		Operating Instructions	7
	5.1	ACR RT-10 Testing	7
	5.2	ACR RT-10 (Without K308 Battery Pack)Testing	7
	5.3	ACR RT-10 (Without K308A Battery Pack)Testing	8
	5.4	RT 278A/URC -10 Testing	8
6.0		Maintenance Instructions	8

TABLES

Table #1	Other Equipment Supplied	2
Table #2	Equipment Required for Calibration	3
Table #3	Troubleshooting	10

LIST OF FIGURES

Figure #1	Cable	11
Figure #1A	Transmitter Module	11
Figure #2	Transformer Connection	12
Figure #3	Calibration Test Setup	13
Figure #4	Test Adapter Schematic	14
Figure #5	Test Adapter ACR A2A Exploded View	15
Figure #6	Accessories of ACR A2A Test Adapter	16

TABLE OF CONTENTS

SECTION II	Parts Breakdown	17
1.	General	17
2.	How to Use the List	17
3.	Vendors Code	18
	Parts Breakdown List	19

1.0 GENERAL

This manual provides Instructions for Transceiver Test Adapter, ACR-A2A as manufactured by ACR ELECTRONICS CORP.

2.0 PURPOSE

The Transceiver Test Adapter, ACR A2A is designed to provide a "GO" or "NO GO" measurement of the performance characteristics of Radio Sets, ACR RT-10, ACR RT-10MI, and Bendix RT-278A when used in conjunction with Transceiver Test Set T906.

3.0 DESCRIPTION

The Transceiver Test Adapter consists of an audio transducer, audio amplifier, R.F. matching network, tuning cover, power cable adapter, dummy battery pack and current meter overlay. (See Table I) Mechanically the Test Adapter provides mounting facilities and electrical connections for the Radio Sets. Provisions are made to test ACR RT-10 and ACR RT-10MI with or without battery pack.

4.0 PREPARATION FOR USE (FOR PMEL USE ONLY)

The Transceiver Test Adapter requires a power source of 16 VDC which is provided by the Transceiver Test Set, T906. The Transceiver Test Set must be calibrated per T.O. 33D7-38-17-1 prior to performing the following calibration of the ACR-A2A Test Adapter.

OTHER EQUIPMENT SUPPLIED

Quantity	ACR P/N	Nomenclature	Application
1	A1-16-0015	* Tuning Cover	Permit access for tuning type ACR RT-10, ACR RT-10MI and RT-278A/URC-10 Radio Sets.
1	P4-01-0009	* Dummy Battery Pack	Permit Testing of ACR RT-10 and RT-10MI without K308A Battery Pack.
1	A1-15-0028	**Spacer Block	Permit testing of ACR RT-10 and RT-10MI without K308 Battery Pack.
1	A3-01-0024	* Power Cable Adapter	Permit testing of ACR RT-10 and RT-10MI without Battery Pack.
1	A1-20-0001	*Current Meter Overlay	Provides indication of Go-No-Go areas for current drain of the ACR RT-10, RT-10MI and RT-278A/URC-10 Radio Sets.

* See Figure 6
** See Figure 5 - Item 16

EQUIPMENT REQUIRED FOR CALIBRATION

Nomenclature	P/N or Model	Application	Range	Accuracy	*
Radio Set	ACR RT-10				1
Radio Set	ACR RT-10MI				1
ACVTVM	400D	Voltage Measurement	.Imv/300v	±2%	2
Audio Signal Generator	200CD	Signal Source	5 cps/60Kc	±2%	2
Power Meter	434A or Equiv.	Power Measurement	0/10W	±5%	2
Transformer	DO-T4 or Equiv.	Impendance Matching	25cps/ 20Kc	N/A	3

* Code of Manufacturer:

1. ACR Electronics Corp.
2. Hewelett Packard
3. UTC

4.1 CALIBRATION OF TEST ADAPTER ACR-A2A (FOR PMEL USE ONLY)

4.1.1 Connect the Test Adapter to the T906 which has been previously calibrated per TO 33D7-38-17-1.

4.1.2 Remove the back from an operational ACR RT-10. Remove the modules from the transceiver.

4.1.3 Connect the 3ohm secondary of a 600 ohm to 3 ohm matching transformer to the transceiver as shown in Figure No. 2.

4.1.4 Connect the test equipment (See Table II) per the calibration test setup of Figure No. 3. Turn on the test equipment and allow 15 minutes warmup.

4.1.5 Set the audio oscillator to 1KC and the AC VTVM to 1 volt scale.

4.1.6 Adjust the amplitude of audio oscillator output for 350 mv as read on the ACVTVM.

4.1.7 Disconnect the ACVTVM.

4.1.8 Place the transceiver on the Test Adapter, utilizing the Tuning Cover (A1-16-0015) and the Spacer Block (A1-15-0028). Clamp the transceiver in place with its antenna pulled out to the first section.

4.1.9 Place the T906 into its "Receive" function.

4.1.10 Remove the snap plug from the access hole to R602 on the side of the Test Adapter.

4.1.11 Using a 1/8" blade screwdriver, adjust R602 for an indication on the T906 "Performance" meter.

4.1.12 Tune the audio oscillator for maximum indication on the T906 "Performance" meter. Reduce the setting on R602 if necessary to keep the meter pointer on scale. A peak should be reached at 1KC ± 100 cps as indicated by the audio oscillator dial. Unclamp transceiver to expose transformer secondary terminal (3ohm Secondary).

4.1 CALIBRATION OF TEST ADAPTER ACR-A2A (FOR PMEL USE ONLY)

4.1.1 Connect the Test Adapter to the T906 which has been previously calibrated per TO 33D7-38-17-1.

4.1.2 Remove the back from an operational ACR RT-10. Remove the modules from the transceiver.

4.1.3 Connect the 2ohm secondary of a 600 ohm to 3 ohm matching transformer to the transceiver as shown in Figure No. 2.

4.1.4 Connect the test equipment (See Table II) per the calibration test setup of Figure No. 3. Turn on the test equipment and allow 15 minutes warmup.

4.1.5 Set the audio oscillator to 1KC and the ACVTVM to 1 volt scale.

4.1.6 Adjust the amplitude of audio oscillator output for 350 mv as read on the ACVTVM.

4.1.7 Disconnect the ACVTVM.

4.1.8 Place the transceiver on the Test Adapter, utilizing the Tuning Cover (A1-10-0015) and the Spacer Block (A1-15-0038). Clamp the transceiver in place with its antenna pulled out to the first section.

4.1.9 Place the T906 into its "Receive" function.

4.1.10 Remove the snap plug from the access hole to R602 on the side of the Test Adapter.

4.1.11 Using a 1/8" blade screwdriver, adjust R602 for an indication on the T906 "Performance" meter.

4.1.12 Tune the audio oscillator for maximum indication on the T906 "Performance" meter. Reduce the setting on R602 if necessary to keep the meter pointer on scale. A peak should be reached at 1KC ± 100 cps as indicated by the audio oscillator dial. Unclamp transceiver to expose transformer secondary terminal (Sohm Secondary).

4.1.13 Measure the output of the matching transformer secondary with the ACVTVM and make sure it is still 350mv. (Readjust amplitude if necessary). Clamp the transceiver back into position on the Test Adapter.

4.1.14 Adjust R602 for a center scale reading on the T906 "Performance" meter. Replace the snap button on the R602 access hole.

4.1.15 Remove the transceiver from the Test Adapter and disconnect the test setup.

4.1.16 Place the transmitter module of a RT-10 M-1 Transceiver in an unmodified RT-10 Transceiver. NOTE: The input impedance to the meter is 50 ohms and the load impedance to the transmitter module must be 50 ohms. Therefore, do not adjust the transmitter module in a modified transceiver (RT-10 M-1). Disconnect the gray wire which is connected to the antenna terminal post. Through the hole in the tuning cover (a cover with a 1/4 inch hole drilled so that the wire will protrude thru the hole) connect cable (Figure #1) from wire to power meter. Connect center conductor to gray wire, and put ground lug under nearest captive screw. The cable should be in increments of 15 1/16 inch. Apply power to transmitter module. It is recommended that the power supply in the T-906 be used by connecting the RT-10 to the Test Adapter ACR A2A. Then connect Test Adapter A2A to the T-906. Adjust transmitter module to 200mw by adjusting L-103 for desired output, while keeping C-112 peaked. (C-112 is a critical adjustment.) (See Figure 1A.) Disconnect test set-up.

RT-10 Transmitter Module Alignment:

1. Connect the output of the transmitter module to a non-reactive 50 ohm wattmeter. NOTE: Do not use the M-1 modification in this connection.

4.1.13 Measure the output of the matching transformer secondary with the ACVTVM and make sure it is still 350mv. (Readjust amplitude if necessary). Clamp the transceiver back into position on the Test Adapter.

4.1.14 Adjust R602 for a center scale reading on the T906 "Performance" meter. Replace the snap button on the R602 access hole.

4.1.15 Remove the transceiver from the Test Adapter and disconnect the test setup.

4.1.16 Place the transmitter module of a RT-10 M-1 Transceiver in an unmodified RT-10 Transceiver. NOTE: The input impedance to the meter is 50 ohms and the load impedance to the transmitter module must be 50 ohms. Therefore, do not adjust the transmitter module in a modified transceiver (RT-10 M-1). Disconnect the gray wire which is connected to the antenna terminal post. Through the hole in the tuning cover (a cover with a 1/4 inch hole drilled so that the wire will protrude thru the hole) connect cable (Figure 4) from wire to power meter. Connect center conductor to gray wire, and put ground lug under nearest captive screw. The cable should be in increments of 15 1/16 inch. Apply power to transmitter module. It is recommended that the power supply in the T-906 be used by connecting the RT-10 to the Test Adapter ACR A2A. Then connect Test Adapter A2A to the T-906. Adjust transmitter module to 200mv by adjusting L-102 for desired output, while keeping C-112 peaked. (C-112 is a critical adjustment.) (See Figure 1A.) Disconnect test set-up.

RT-10 Transmitter Module Alignment

1. Connect the output of the transmitter module to a non-reactive 50 ohm wattmeter. NOTE: Do not use the M-1 modification in this connection.

2. Connect a DC milli meter in the supply voltage leads and apply the voltage to the transmitter module.

3. Tune T-101 for a peak on the wattmeter.

4. Tune T-102 for a peak on the wattmeter.

5. Tune L-102 for a dip on the ammeter.

6. Tune L-103 for a peak on the wattmeter.

7. Tune C-112 for a peak on the wattmeter.

8. Adjust L-103 for the desired output (nominally 200mw) while keeping C-112 peaked and the DC supply current less than 135ma (or in "Accept TXCW" area of current overlay on T906).

4.1.17 Replace the module in the Transceiver RT-10MI. Place the transceiver on the Test Adapter with Tuning Cover (A1-16-0015) and Spacer Block (A1-15-0028). Connect the Power Cable Adapter (A3-01-0024) from the transceiver to Test Adapter power receptacle. Clamp the transceiver in place with its antenna extended to the first section.

4.1.18 Place the T906 into its "Transmit" function.

4.1.19 Remove the snap plug from the access hole to C602 on the bottom of the test adapter.

4.1.20 Depress the transmit button of the transceiver.

4.1.21 Adjust C602 for a mid scale indication on the "Performance" meter of the T906.

4.1.22 The ACR-A2A Test Adapter is now calibrated for use with T906 on which the above calibration was performed. The serial number of the T906 must be written in the appropriate place on the "Caution" sticker on the Test Adapter.

OPERATING INSTRUCTIONS

Prior to any testing, place the "Current Meter" overlay (A1-20-0001) onto the "Power Supply" meter of the T906. The "Power Supply" meter switch should be placed in the AN/URC-10 Current/Plate Current Position. The T906 must have a 1 hour warmup period.

Note 1: All Operating Instructions for ACR RT-10 Testing apply to ACR RT-10M1 Testing.

Note 2: An acceptable RT-10M1 Transmitter tested on the Modified ACR-A2A Test Adapter may at times give a "Reject" reading, due to misalignment. The misalignment can be corrected by tuning the C-112 of the Transmitter module. Therefore, when an RT-10M1 Transmitter indicates a "Reject" condition, it is recommended that prior to rejecting the Transmitter, capacitance C-112 of the module be adjusted for a peak and/or a maximum reading on the "Accept - Reject" meter. C-112 must be adjusted with a non-metalic screwdriver and with the tuning cover (furnished with the Adapter) in place. If the meter still indicates "Reject", the Transmitter should be rejected.

5.1 ACR RT-10 Testing

5.1.1 Connect the ACR A2A Test Adapter to the T906, Transceiver Test Set.

5.1.2 Place an ACR RT-10 onto the Test Adapter with its antenna extended out to the first section. Clamp the transceiver in place.

5.1.3 Attach the ground from the Test Adapter to a convenient captive screw on the back of the transceiver.

5.1.4 Place the T906 "Function" switch to "Receive". The "Performance" meter on the T906 should read "Accept".

5.1.5 Place the "Function" switch of the T906 to "Transmit".

5.1.6 Depress the transmit switch on the ACR-RT-10. The "Performance" meter should read "Accept". If meter does not read "Accept" refer to Note 2 above.

5.2 ACR RT-10 (WITHOUT K308 BATTERY PACK) TESTING

5.2.1 Place the Transceiver on the Test Adapter. Utilizing the Tuning Cover (A1-16-0015) and Spacer Block (A1-15-0028) clamp the transceiver in place with its antenna extended out to the first section.

5.2.2 Connect the Power Cable Adapter (A3-01-0024) between the transceiver and the power receptacle of the Test Adapter.

5.2.3 Place the T906 "Function" switch to "Receive". The "Performance" meter on the T906 should read "Accept". The "Power Supply" meter should read "Accept" as indicated by the overlay.

5.2.4 Place the "Function" switch of the T906 to "Transmit".

5.2.5 Depress the transmit switch on the Transceiver. The "Performance" meter on the T906 should read "Accept". The "Power Supply" meter should read "Accept" as indicated by the overlay. If meter does not read "Accept" refer to Note 2 above.

5.3 ACR RT-10 (WITHOUT K308A BATTERY PACK) TESTING

Insert Dummy Battery Pack (P4-01-0009) into the transceiver, place it onto the Test Adapter with its antenna extended out to the first section. Clamp the transceiver in place and repeat steps 5.2.2 thru 5.2.5.

5.4 RT-278A/URC-10 TESTING

Place the transceiver on the Test Adapter with its antenna extended out to the first section. Utilizing the Spacer Block (A1-15-0028) clamp the transceiver in place. Repeat steps 5.2.2 through 5.2.5. If meter does not read "Accept" refer to Note 2 above.

6.0 MAINTENANCE INSTRUCTIONS

Maintenance of the transceiver test set includes inspection and calibration necessary to maintain the equipment in satisfactory condition.

6.1 Clean the Test Adapter with a small brush especially around the transducer sensing surface.

6.2 Perform visual inspection as follows:

a) Check all cables and connectors for evidence of damage.

b) Check for loose or damaged adjustment components.

6.3 Perform troubleshooting in accordance with the instructions on Table III. Whenever the equipment is inoperative or the operator has reasons to believe that the results obtained are erroneous, troubleshooting procedures should be conducted to determine the extent of the repair or replacement required, to correct the malfunction. (See Figure 4, Test Adapter Schematic).

6.4 Disassembly and assembly of the transceiver test set and its components can be performed by referring to the exploded view (Figure 5). In all cases, replace defective or damaged items with new parts.

TABLE III

TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
None or low receiver performance indication	a. Defective transducer (MK1) b. Defective transformer (T1) c. Defective amplifier (A2) d. Defective audio connector (Part of P1).	a. Replace transducer b. Replace transformer c. Troubleshoot for defective component in the amplifier d. Replace audio connector
None or low transmitter performance indication	a. Defective tuning capacitors C1 and/or C2 b. Defective R. F. connector (Part of P1)	a. Replace defective capacitor b. Replace defective connector
No receiver, transmitter and current indication	a. Defective power connector (J1) b. Defective test adapter plug (P1)	a. Replace power connector b. Replace or repair plug

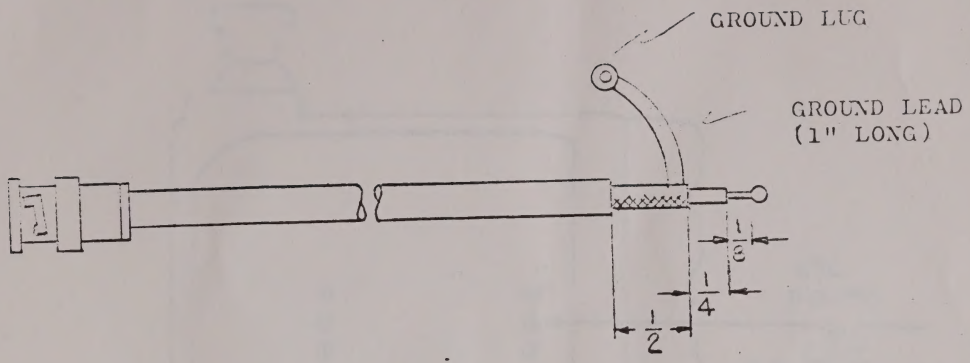


FIGURE #1
CABLE

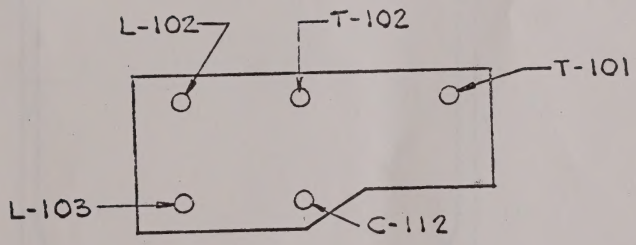
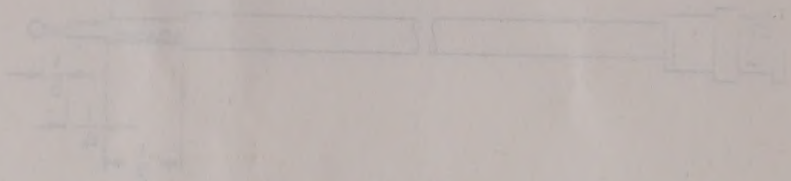
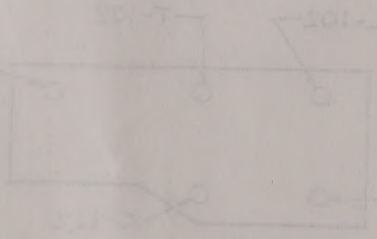


FIGURE #1A
TRANSMITTER MODULE





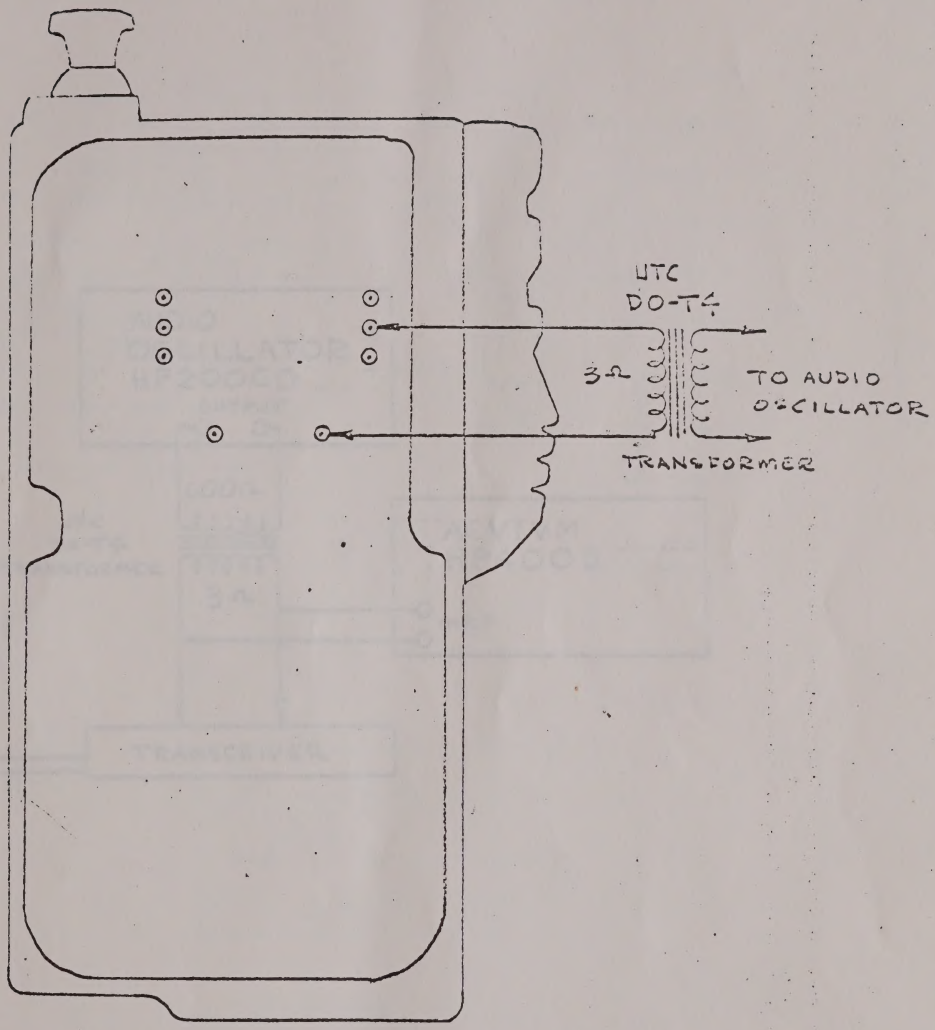
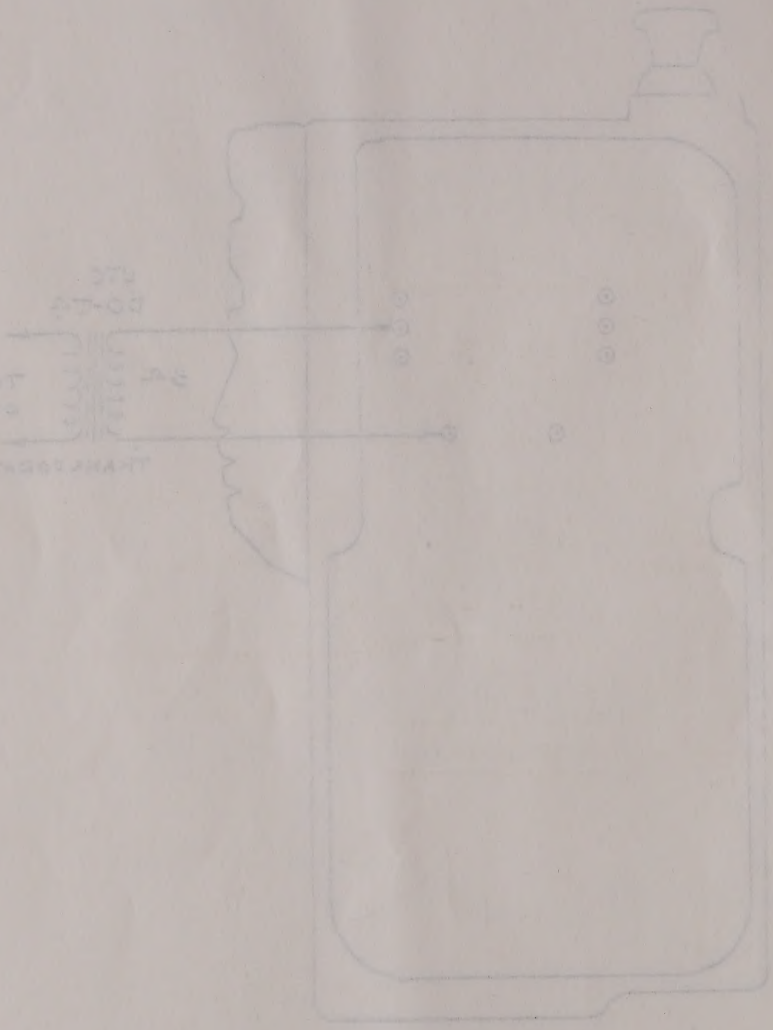


FIG. # 2

TRANSFORMER CONNECTION



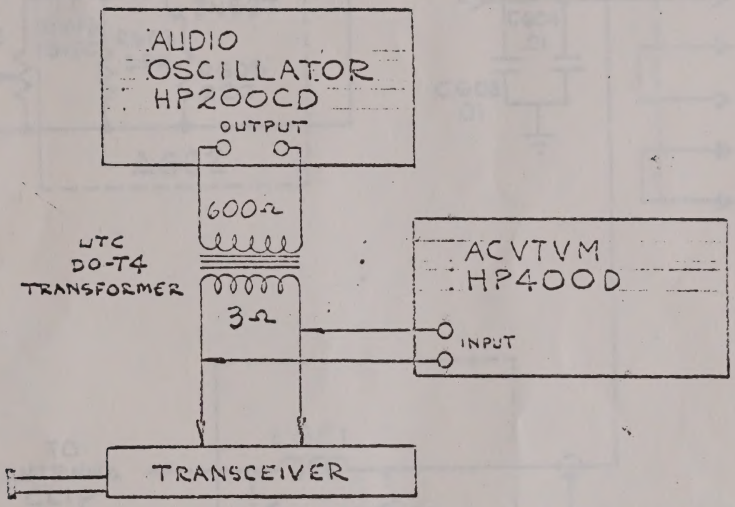


FIG. #3

CALIBRATION TEST SETUP

FIG. #3

CALIBRATION TEST SETUP

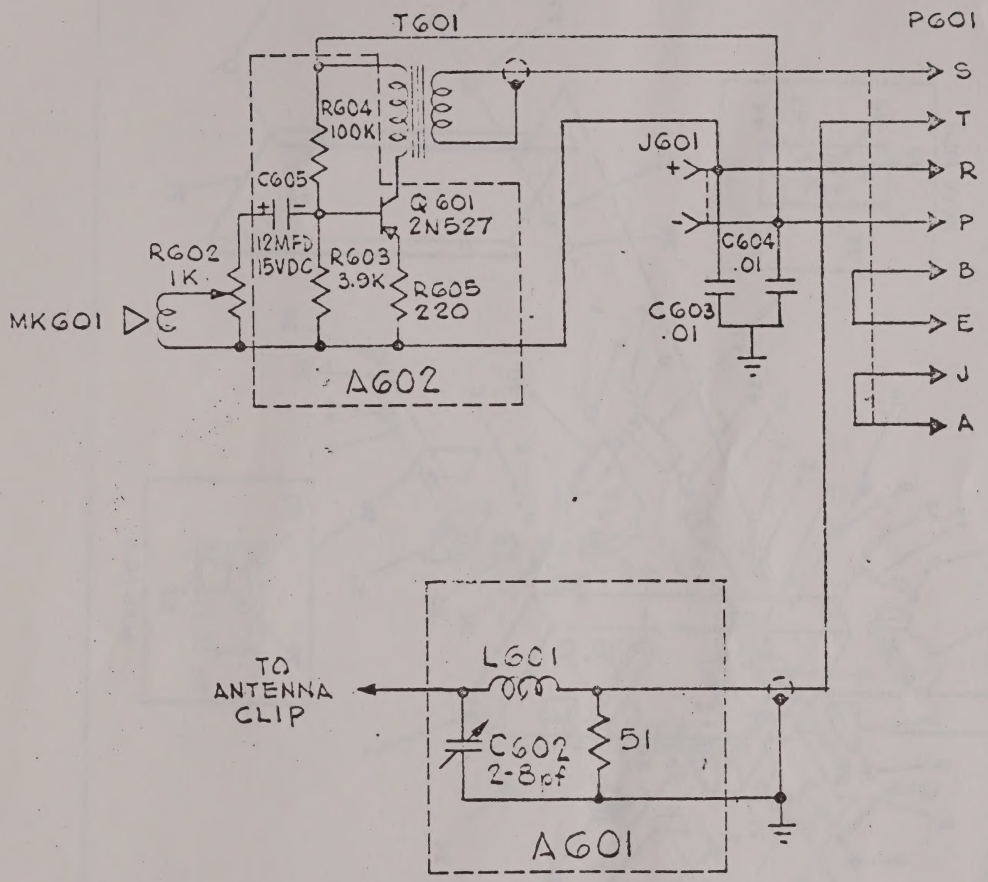


FIGURE 4

TEST ADAPTER SCHEMATIC

REV.	CHANGE	DWN	APV	DATE
A	REV. A601	BAW		1-24-67

TOLERANCE EXCEPT AS NOTED
FRACTION
DECIMAL
OTHER
SCALE:
MATERIAL
FINISH

TITLE TEST ADAPTER SCHEMATIC

APPLICATION ACR-A2A(32-01-0007)

ACR ELECTRONICS CORP.
NEW YORK, N. Y.

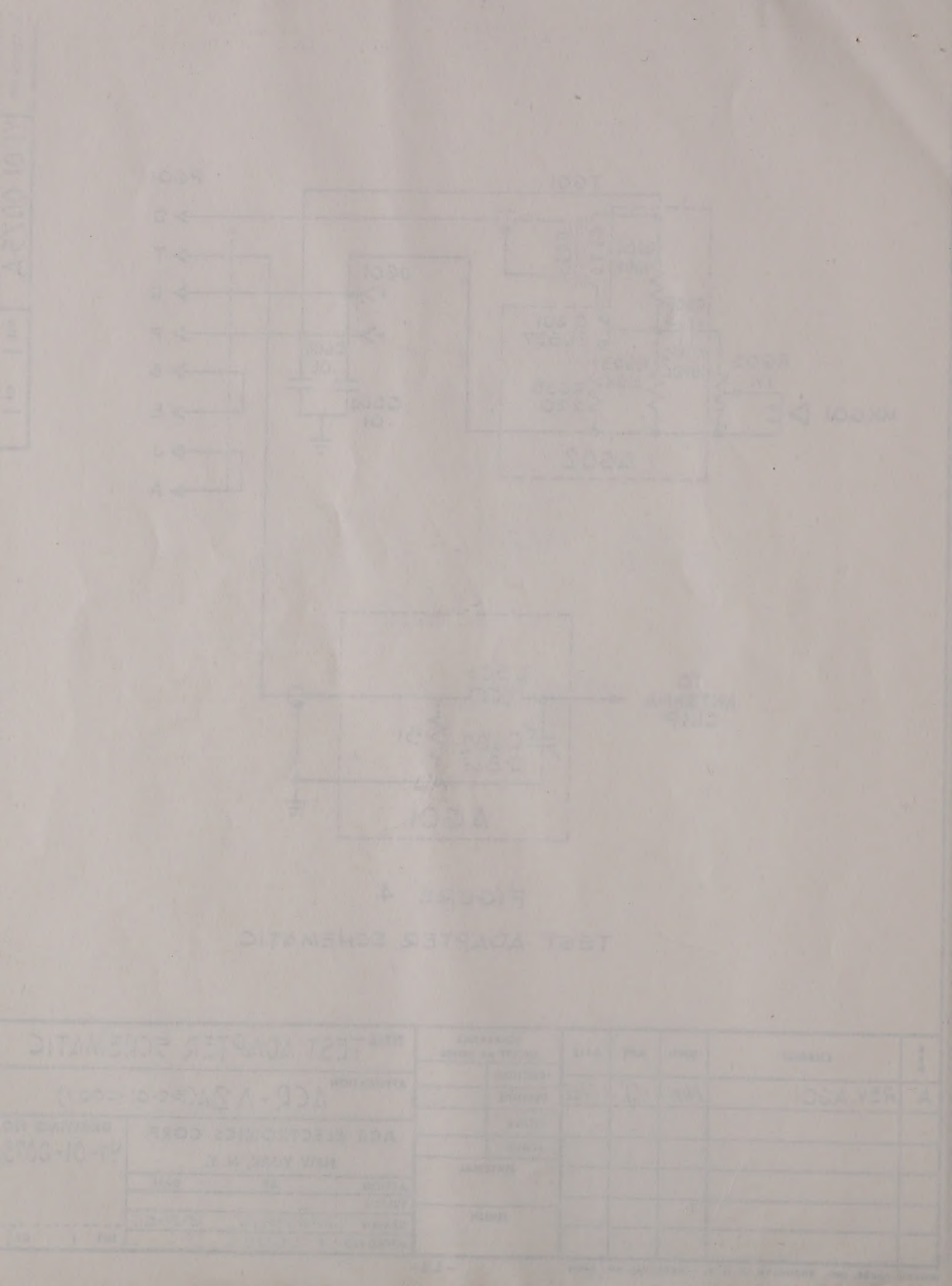
DRAWING NO. Y1-01-0073A

ACTION	BY	DATE
SKETCH		
DRAWN	BAWINGATE	5-31-65
APPROVED	E LERNER	6-1

SHT 1 OF 1

DRAWING NO. Y1-01-0073A SHT 1 OF 1

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. REPROVEL NO. 490M



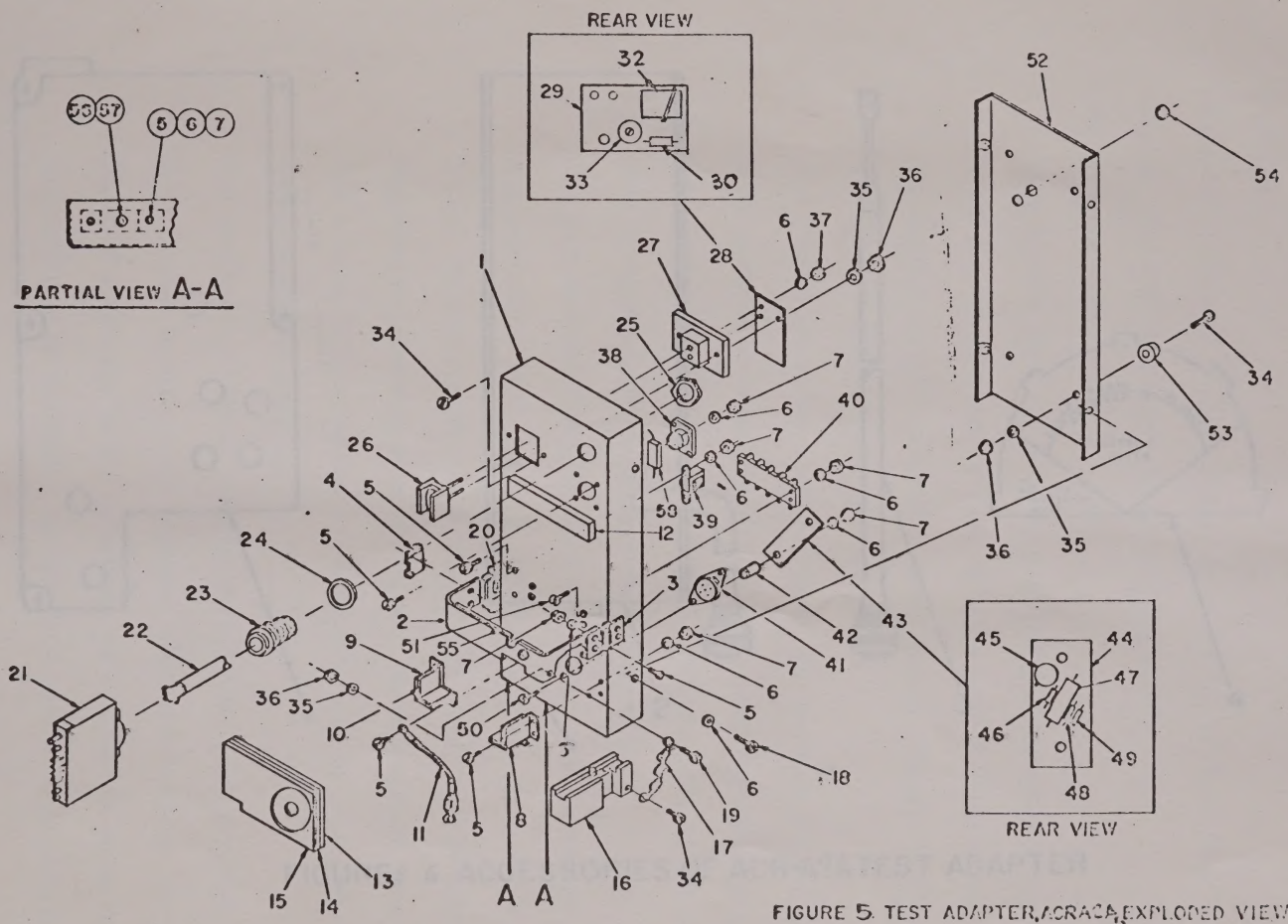
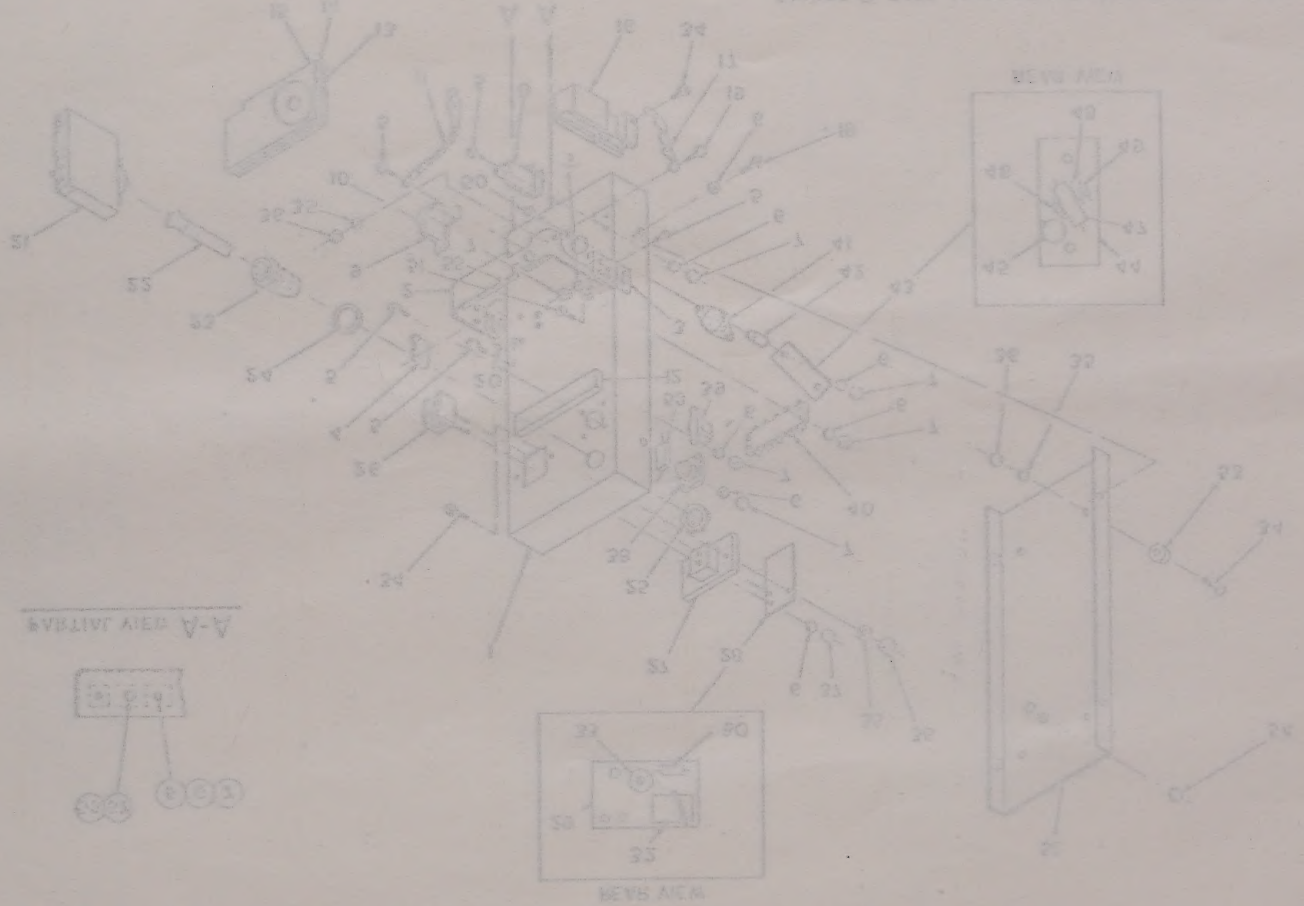
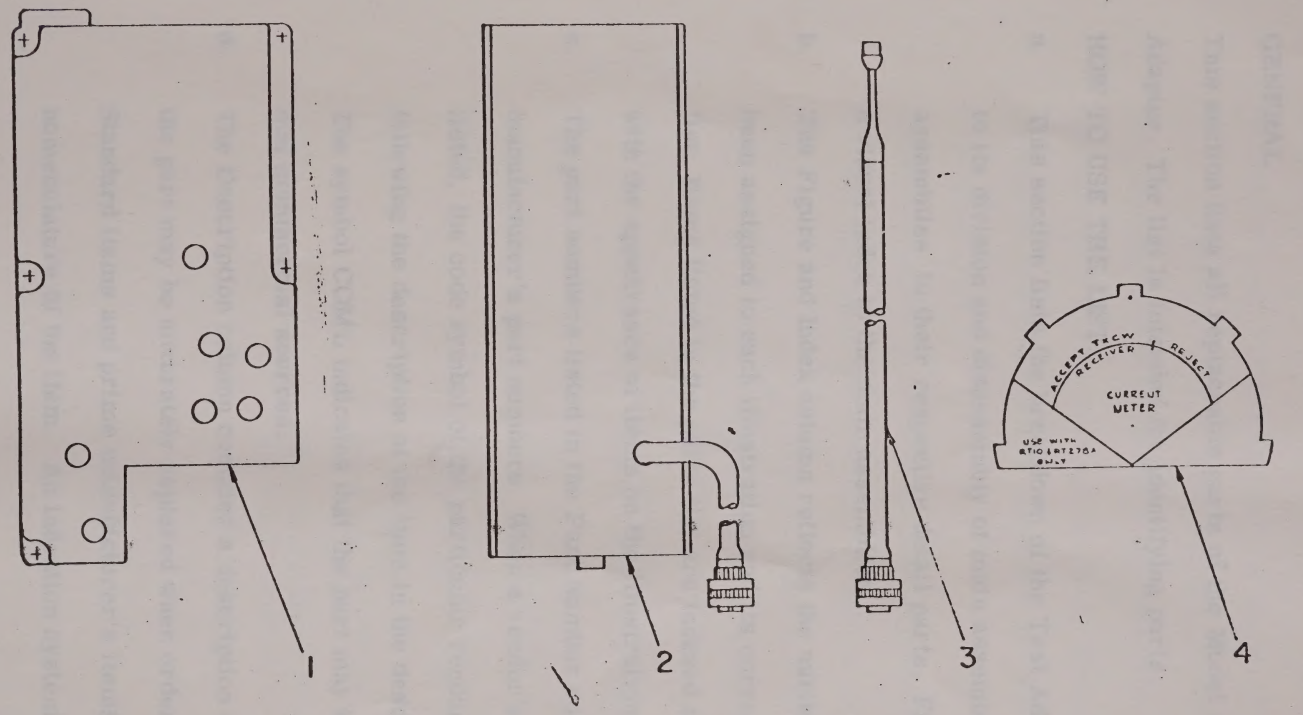
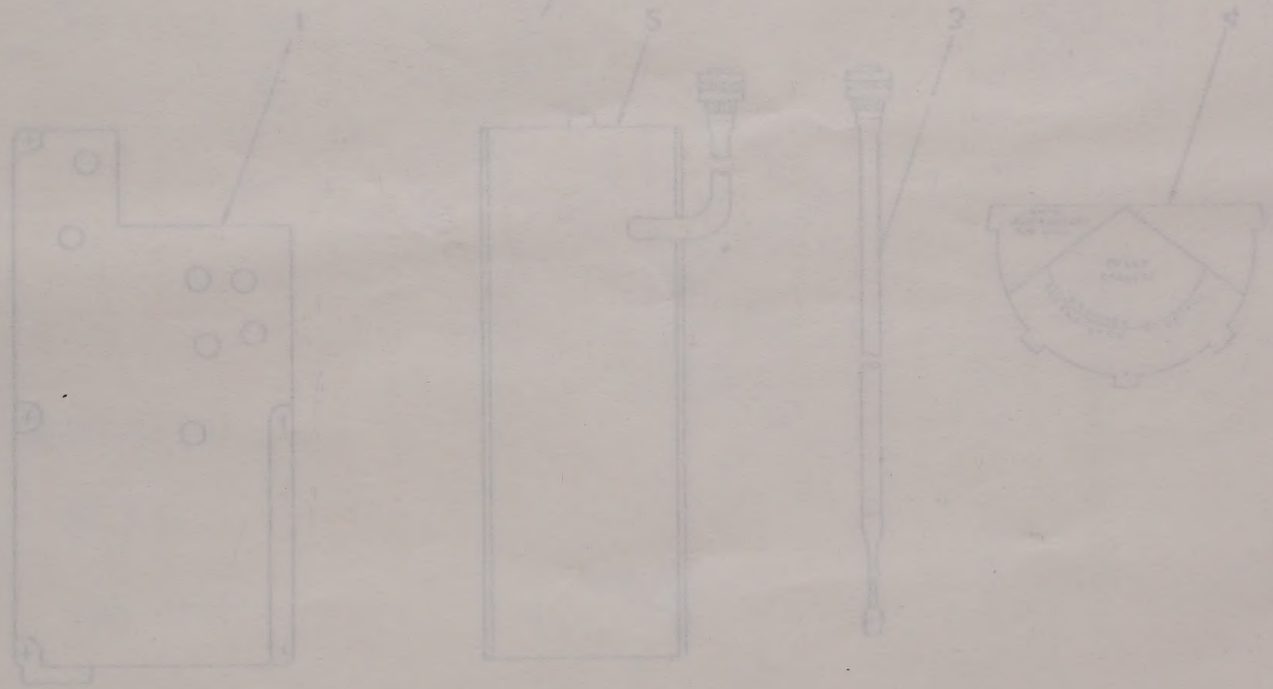


FIGURE 5. TEST ADAPTER, ACRACA, EXPLODED VIEW





FIGURE# 6 ACCESSORIES OF ACR-A2ATEST ADAPTER


1
5
2
4

SECTION II
PARTS BREAKDOWN

1. GENERAL

This section lists all replaceable parts of the Model ACR-A2A Test Adapter. The list is intended for identifying parts.

2. HOW TO USE THE LIST:

a. This section lists the breakdown of the Test Adapter in regard to its division and disassembly of main assemblies and sub-assemblies to their respective detail parts. Figure 5 serves as a visual index to the main assemblies.

b. The Figure and Index column reflects the numbers which have been assigned to each illustration and its corresponding parts list. Items listed in the parts list are indexed and keyed to agree with the appearance of items on the illustrations.

c. The part numbers listed in the Part Number column are the manufacturer's part numbers. When a vendor's part number is listed, the code symbol of the particular vendor will be shown following the description of the item in the description column. The symbol COML indicates that the part may be procured from normal commercial sources.

d. The Description column contains a description of each item so that the part may be accurately replaced when ordered from the source. Standard items and prime manufacturer's items are identified by the nomenclature of the item. An indention system is employed to show

the relationship of any part of a subassembly to its next higher assembly. All parts are listed in order of disassembly, and are followed by their respective attaching parts. The symbol .....* ..... indicates the end of the attaching parts.

e. The quantities listed in the Units Per Assembly column reflect the quantity of that item at that location. Within each assembly breakdown, the quantities for each part are for one of that assembly.

3. VENDORS CODE

Listed below are all the Vendor Code symbols found; the parts list with the names and addresses of the vendors.

CODE	Vendors Name & Address
04713	Motorola Semiconductor Prod., Inc. Phoenix, Arizona
56289	Sprague Electric Co. North Adams, Massachusetts
72982	Erie Technological Products, Inc. Erie, Pennsylvania
75382	Kulka Electric Corp. Mount Vernon, New York
83330	H.H. Smith Brooklyn, New York
98003	Nielsen Hardware Company Hartford, Connecticut

Figure & Index No.	Part Number	DESCRIPTION	Units Per Assembly
4-	B2-01-007	Test Adapter ACR-A2A	
1	A1-16-0010	Chassis	1
2	A1-17-0032	Clamp Lock	1
3	A1-17-0034	Hinge	1
4	SC-D-20650-30	Strike (98003) (Attaching Parts)	1
	COML	Rivet .123 dia. X .250, Oval brass, Nickel plated	2
		.....*.....	
5	MS35233-14	Screw, Machine	20
6	MS35333-70	Washer, Lock	32
7	AN340C4	Nut, Hex	24
8	A1-17-0033-2	Bracket, L-H	1
9	A1-17-0033-1	Bracket, R-H	1
10	A1-18-0045	Gasket	4
11	A3-01-0025	Ground Clip Assembly	1
12	A1-18-0047	Gasket	1
13	A1-18-0046-1	Gasket	1
14	A1-18-0046-2	Gasket	1
15	A1-18-0046-3	Gasket	1
16	A1-15-0028	Block, Support	1
17	A1-17-0054	Chain	1
18	MS35233-12	Screw, Machine	4

Figure & Index No.	Part Number	DESCRIPTION	Units Per Assembly
4- 19	MS35233-30	Screw, Machine	1
20	SC-D-20648	Catch, Spring (98003)	1
21	MRX14-2P-GH	Connector, Plug, Electrical	1
22	A3-01-0015A	Cable, Assembly	1
23	DB-438	Clamp - Cable (08730) (Attaching Parts)	1
24	COML	Washer Insulating	1
25	COML	Nut-Special (Supplied with Item 23)	1
		.....*.....	
26	A3-06-0040	Antenna Contact Assembly	1
27	A1-18-0043	Antenna Clip Mount	1
28	A3-06-0030	Circuit Board Assembly	1
29	A1-07-0007	Printed Circuit Board	1
30	RC32G510J	Resistor, Fixed	1
31		N/A	
32	A3-06-0029	Coil, Assembly	1
33	538-002-NPO-2-8pf	Capacitor, Variable (72982)	1
34	MS35233-30	Screw, Machine	7
35	MS35333-71	Washer, Lock	7
36	AN340C6	Nut, Hex	7
37	AN340C2	Nut, Hex	2
38	MS3102E-10SL-4P	Connector	1
39	A1-09-0009	Transformer	1

Figure & Index No.	Part Number	DESCRIPTION	Units Per Assembly
4- 40	600A-4	Terminal Board (75382)	1
41	A1-03-0003	Micro Phone (Attaching Part)	1
	A1-18-0048	Clamp	1
		.....*.....	
42	A1-17-0063	Spacer	2
43	A3-06-0039	Circuit Board Assembly	1
44	A1-07-0016	Printed Circuit Board	1
45	2N527	Transistor (04713)	1
46	RC07GF104J	Resistor, Fixed	1
47	31D44	Capacitor, Fixed (56289)	1
48	RC07GF392J	Resistor, Fixed	1
49	RC07GF221J	Resistor, Fixed	1
50	MS35249-27	Screw, Machine	2
51	MS35249-24	Screw, Machine	4
52	A1-16-0009	Cover, Bottom	1
53	2135	Bumpers (83330)	4
54	A1-18-0069	Plug, Snap	3
55	A1-18-0060	Gasket	1
56	RV6LAYSA102A	Resistor, Variable	1
57	A1-17-0050	Bracket	1
58	8131-026-2540-103M	Capacitor Fixed (72982)	2
5-		Accessories	
1	A1-16-0015	Cover, Tuning	1

SECTION II

Figure & Index No.	Part Number	DESCRIPTION	Units Per Assembly
5- 2	P4-01-0009	Pack, Battery, Dummy	1
3	A3-01-0024	Adapter, Power Cable	1
4	A1-20-0001	Overlay, Current Meter	1